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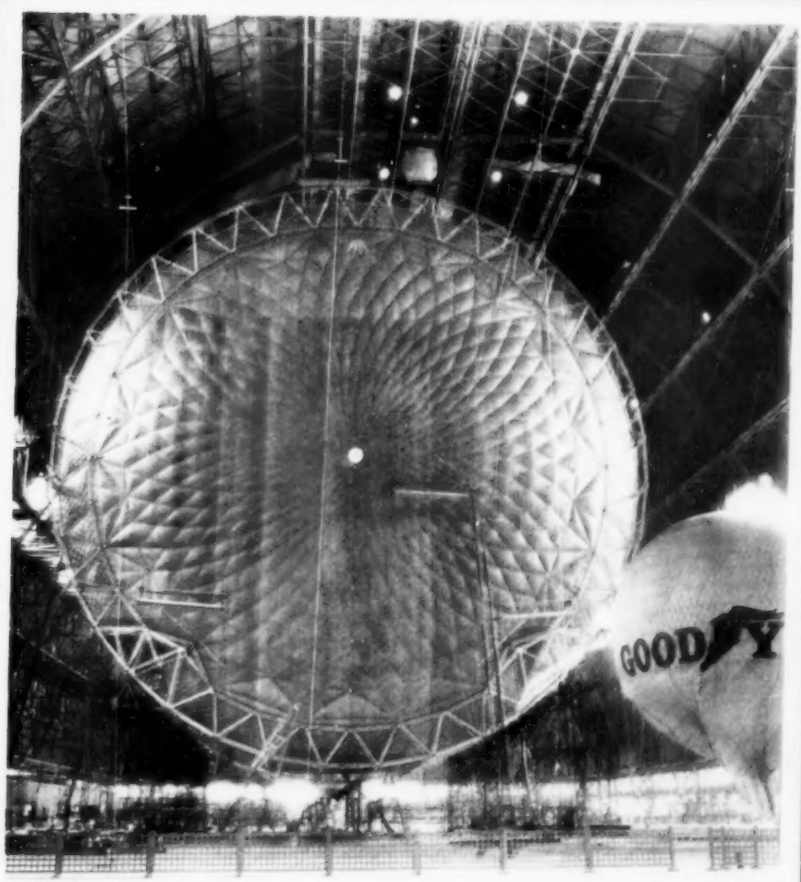
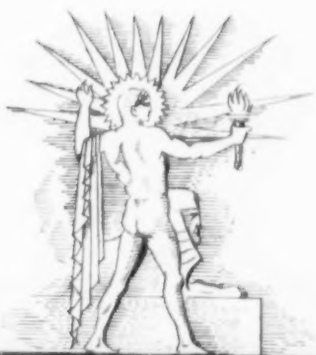
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





NOVEMBER 15, 1930

Warrior of the Air in Embryo

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW THAT

The drought has so seriously affected waterfowl in the United States and Canada that some observers estimate the season's hatch to be 50 per cent. below last year's.

A British quarrying firm employs an airplane to carry samples of stone to distant customers.

There is more oxygen in Atlantic Ocean water than in Pacific water, why, science does not yet know.

When a flapping scarecrow failed to keep the birds from robbing his orchard, an English farmer gave his scarecrow a radio "voice," and the noise from the radio loudspeaker quickly banished the bird invaders.

The arms of an orang-utan are so long that when one of these apes stands erect its hands hang at its ankles.

A new variety of sugarcane that yields an extra ton of sugar to the acre has been bred by Federal scientists at Canal Point, Fla.

Natural gas is used to make half a million tons of ice each year.

An Eskimo hut, heated by seal-oil lamps, has a temperature of 70 to 80 degrees.

As late as the seventeeth century, butter was sold in drug shops of Spain as an ointment.

"Islands" of land in the inland ice of Greenland have been found by Dr. Lauge Koch, Danish explorer.

A new jelly has been derived from sea moss on the Pacific coast by a modernized process featuring artificial refrigeration.

WITH THE SCIENCES THIS WEEK

MEDICINE

Tests on College Girls Show Minute Virus Causes Colds

Organisms are Passed Through Finest Filters Before Infecting Girls in Johns Hopkins Experiments

NINETEEN college girls are the latest heroines in medical science's attack on the common cold.

Through their temporary suffering from the colds with which they were experimentally infected by Drs. Perrin H. Long and James A. Doull of the Johns Hopkins University Medical School, these volunteers aided in the discovery of the important fact that the infecting agent of the common cold is a filterable virus, so minute that it passes through the finest of filters and so difficult to grow that it can not be cultured by ordinary methods.

These are important steps toward the conquest of this disease that is particularly prevalent in the fall and winter, but much more research will be necessary before a prophylactic can be offered the suffering public.

The college girl subjects of the experiments are known in the reports only by their initials, as is customary in medical reports. One of them volunteered to be the subject of experiment twice, the others were the subjects of only one experiment each.

Confirm Early Views

The results of the experiments of Drs. Long and Doull extend and confirm the views of earlier investigators who showed that the common cold is an infectious disease transmitted from one person to another by something present in the nasal secretions of people ill with colds. But the Johns Hopkins investigators have narrowed down the search for the guilty organism to one that is in the same class, so far as size is concerned, with the causative agents of smallpox, hoof and mouth disease, and even more dreadful diseases.

They proved that the filterable virus of cold is present in liquid that had passed through the finest of filters, the Berkefeld W porcelain filter and the Seitz filter of asbestos. These strain out organisms that are passed by filters that heretofore have been considered extremely fine, and the filtrate is actually sterile from the standpoint of ordinary bacteriological technique. Yet this filtrate passed on the colds to the college girl subjects.

As it has been impossible to cultivate the cold virus in the way that ordinary germs are grown, the next step planned in the attack on the cold is to attempt tissue culture growth of the virus. By introducing the submicroscopic cold germs to the presence of living cells kept alive in test tubes, it is hoped that the cold virus may be grown artificially. That may give the experimenters a chance to try to develop a protective vaccine.

Because colds are prevalent in the fall and winter and infrequent in the summer, the experimental work is done in the summer to minimize the chance of human test subjects picking up colds accidentally. The researches just reported in the *Proceedings of the Society for Experimental Biology and Medicine* were made last summer and now continuing research is being planned for next summer.

The John J. Abel Fund for Research on the Common Cold, supported by the Chemical Foundation, conducted the researches. Dr. Long will continue the work next year while Dr. Doull this fall joined the faculty of the Western Reserve University.

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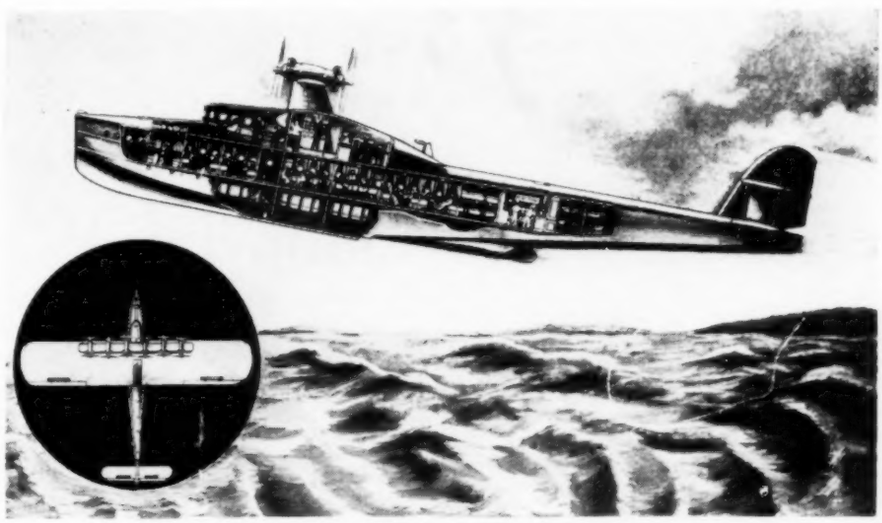

THE SIZE OF THE HUGE DORNIER DO-X

Which has begun a flight from Germany to America where it will spend the winter, is well illustrated by this cut-away view of the craft in flight. This is the largest airplane ever built. It can rise with a 60-ton load, including fuel, but its fuel consumption is so great that the pay load decreases rapidly as the length of flight is increased. The plane has lifted as many as 169 people for a short flight.

GENETICS

Strange Goats Faint When Frightened

A FLOCK of goats having the very queer habit of falling over, stiff and unconscious, when they are frightened has just been reported to the American Genetic Association in Washington by Prof. Jay L. Lush of the Iowa State College.

The goats were observed by Professor Lush when he was in Texas connected with the Texas Agricultural Experiment Station. They were all bred from one stock which came from Tennessee. The strange behavior seems to run in this particular goat family.

The animals could be frightened in many ways, the principal element necessary being surprise. At a loud noise like the discharge of a gun or the sudden throwing down of an iron wash tub, the goats would become perfectly rigid.

"While in this condition," Dr. Lush said, "they can be pushed or turned over as if they were carved out of a single piece of wood. This spell or 'fit' usually lasts only a short time—about ten to twenty seconds. They recover the use of their muscles in the front end of the body first. Often one will see these goats, on recovering from fright, re-

gain control of their forelegs enough to start running away, but the two hind legs will drag or move very stiffly as if the goat were still quite stiff from the loin back although fully in control of the muscles of its front legs, head and neck.

"After having been thus frightened a goat cannot usually be frightened again no matter how great the excitement may be, until it has had at least twenty or thirty minutes to rest."

Not all the goats fall over when frightened. Dr. Lush believes that it may be only those who have started to run and are caught off balance who topple over. Some become rooted to the spot in a standing position and remain "utterly motionless" for many seconds.

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PSYCHOLOGY

It's a Happy World, Think 88 Per Cent of the People

People Happy in One Activity Tend to be Happy in All, Studies Made by Prominent Psychologists Show

IT'S A HAPPY world, on the whole. Not many people want to be dramatic figures of tragedy in the eyes of their fellows. On the contrary, most of us humans like to rate ourselves as being happier than average.

This light on human nature has been cast by a new psychological study of happiness made by Dr. Randolph Sailer, of Yenching University in China. Dr. Sailer worked under the direction of Dr. Goodwin Watson of Teachers College, Columbia University, who has been analyzing happiness and happy people for several years.

In a questionnaire on their own happiness or lack of it, just 60 workers out of 500 said that the world is more bad than good, or that they were less happy than the average mortal. Not one of the 500 was a complete pessimist or a perfect optimist.

Poor health is definitely linked with unhappiness, according to this survey. It is not yet clear, however, whether illness and physical handicaps cause unhappiness, or whether the situation is sometimes reversed, with unhappiness and worry bringing on physical troubles.

Do you worry about the future? That is a trait that goes with unhappiness, it was found. Few happy people worry about what is going to happen next. Still, the happy person is not happy-go-lucky. Nearly all of the happiest group declared that life should be lived with a serious purpose.

"The happy worry less about the future, about money, sex, jobs, appearance, education or the lack of it," Dr. Watson explained. "They have less fear of failure, less restlessness, fewer fears. Those who are happy in one field, let's say with their friends, tend also to be happy in health, in relation to parents, religion, love, vocation, and schooling. If a man appeared to believe that he was not well treated on the job, it was interesting to note that he believed that life had been unkind to him in many other ways."

Among other findings from the happiness survey are:

The state of a man's finances is no reliable gauge of his happiness. Some of the happiest and some of the most miserable men were found among the low-salaried group.

The "only child" is no more happy or unhappy than the child in a large family.

Smokers as a group are no more or less happy than non-smokers.

Religion plays a role in maintaining happiness.

An even temperament is likely to be a happy one.

And married men are happier than bachelors.

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PALEONTOLOGY

Seek to Prove That Americans Came From Asia

A FIVE-YEAR search for definite evidence of the first American immigrants, who are thought by anthropologists to have come to this continent in prehistoric times from Asia, was described in a report to the American Philosophical Society by Dr. Ales Hrdlicka, curator of the division of physical anthropology of the U. S. National Museum.

Under Dr. Hrdlicka's direction, the National Museum has been carrying on intensive anthropological and archaeological work in Alaska since 1926. The remaining fullblood Alaskan people, both Eskimo and the rapidy vanishing Indian, have been studied, and old sites have been examined for traces of their prehistoric predecessors.

In these latter investigations lay a surprise for the archaeologists; for there was discovered a wholly unexpected rich and highly artistic Eskimo culture, represented mainly in implements of walrus ivory which have since become fossilized. This culture antedates the well known recent Eskimo culture.

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HEREDITY

Given Airplane, Ancestors of Lindbergh Would Have Flown

LINDBERGH'S ancestors probably had his capacity for aviation, but they had no opportunity to make use of it because the airplane had not been developed. The ability to fly depends on several factors, some of which are inherited and some the result of surroundings.

This interesting statement was made by Dr. Albert F. Blakeslee, of the Department of Genetics, Carnegie Institution of Washington, in a radio talk presented over the Columbia Broadcasting System under the auspices of Science Service.

"This last summer," Dr. Blakeslee said, "a newspaper reporter asked me to predict the future of the Lindbergh baby from the standpoint of its inheritance. The reporter seemed to think a student of heredity ought to be able to tell what a child will amount to if he knows what its parents have accomplished. I declined, however, to be a fortune teller and give a detailed horoscope of the infant. No doubt I was

expected to say that the child will become a great flier like his father.

"If the child should spend many of his future hours in the air, as he doubtless will, would this be chiefly because he has inherited his father's capacity to learn aviation or chiefly because he is brought up in aviation surroundings? In other words would flying in his case be due to heredity or to environment? As a matter of fact it would probably be due to both. The capacity to learn to co-ordinate body and mind necessary to one who guides an airplane is undoubtedly inherited. The flyer Lindbergh inherited such capacity from his ancestors although his ancestors never had an opportunity to show this capacity in actual flying. They lacked an aviation environment."

"We start life," Dr. Blakeslee explained, "like a photographic plate which has been exposed. There is a potential image ready for development, which corresponds to the heredity. Chemical solutions in the hands of the photographer furnish an environment which reveals the lines already impressed upon the negative. Differences in this environment brought about by changes in the manner of developing the negatives may alter the appearance of the finished picture. And yet the development can bring nothing new into the picture. Its outlines were foreordained at the moment the sensitized plate was exposed in the camera. After we are born, we cannot change our heredity, though we can change our environment."

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HISTORY

Names of Days Unchanged Since Romans Ruled Rhine

SUNDAY was Sunday when the Romans ruled the Rhine, Monday was Monday, and the rest of the days of the week had the same names they have now. This is indicated by an old pottery calendar found in the ancient temple district at Trier by Dr. Siegfried Loeschke of the Provincial Museum.

The days of the week were indicated by figures of the gods whose names they bear: Sunday by a head with a halo of rays, Monday by a head crowned with a horned moon, and so on. Beneath each figure was a little hole, in which a peg could be placed. Each day the peg was moved over one hole, and so the householder could keep track of what day it was.

The calendar is incomplete, for the two last gods are broken off.

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"FLOWERS OF STONE" BENEATH THE MAYA CIVILIZATION

In Yucatan. When archaeologists have unfolded the story of the surface, miles of caverns, which contain traces of human occupancy and have mysterious inscriptions on their walls, will remain for them to explore.

ARCHAEOLOGY

Gorgeous Caves of Loltún Invite Further Exploration in Yucatan

By DON LUIS ROSADO VEGA,
Director, Museo Arquelogica e Historico de Yucatan

MERIDA, Yucatan.—When all the pyramids, temples and monuments left by the grand civilizations of the ancient Maya shall have been uncovered and restored to some shadow of their splendor, when archaeologists shall have read as much of their story as time has left legible, there will still be mystery and a challenge to science in the caves of Loltún.

The coral-limestone soil of Yucatan is riddled with caverns, most of which have never been explored. They descend into the bowels of the earth for hundreds of feet and ramify for miles, sometimes opening into vast, cathedral-like naves, sometimes contracting into cramped holes through which it is difficult and even perilous to crawl. They are often rich with gorgeous stalactites and stalagmites: the word "Loltún" means "flowers of stone."

In these vast caverns one frequently comes upon traces of human occupancy. Traced on the walls are inscriptions—pictures and hieroglyphs resembling the art of the Maya, which have thus far defied the guesses of archaeologists. No one has been able to demonstrate their date, though it is conjectured from the type of workmanship that they are very early. A few of them are sharp and distinct, but most have eroded to indistinctness or have had their outlines blurred by stalactitic deposits.

It is unlikely that these caverns were ever used for human habitation. More probably they were resorted to for religious purposes. The inscriptions would indicate that, for picture-writing among all primitive peoples is almost invariably a secret of the priestly caste.

Their use as burial places has been suggested, but the evidence is uncertain. One early explorer claimed to have found a swathed mummy in one of them, but this has not been confirmed.

All the work thus far done in the Loltún caverns has been of the barest preliminary character. The unriddling of their mystery is reserved for a future archaeological generation.

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ARCHAEOLOGY

Ancient American Inventions

By EMILY DAVIS

SOME of the first paragraphs of the story of American invention are now being dug up in the course of archaeological investigations into America's buried past. The Eighth Bernheimer Expedition which has returned from a hard summer's digging in the Southwest, has reaped a harvest of ancient Indian belongings that could be lined up to make an impressive display of Indian inventiveness. And the display would include some brand new features of Indian ingenuity—that is, new to our twentieth century knowledge of what went on in B. C. America. The expedition, conducted under the auspices of the American Museum of Natural History, spent its summer digging deep into graves, pits, and refuse piles in seventeen caves of northeastern Arizona. Indians of the Basket Maker Age, who lived in the Southwest two thousand years ago, and even earlier, chose those particular caves and those arid, rocky canyons as convenient storage places and cemeteries. They themselves lived mostly in the open nearby. That part of the Basket Maker territory has remained undisturbed, even by adventurous archaeologists, until now.

Taking inventory of his collection of strange objects, some time-worn and out of shape, some fresh as when used by their owners, the leader of the expedition, Charles L. Bernheimer, selected a ring made of fiber as one of the highlights of this year's discoveries.

Baby's Fiber Ring

"The fiber ring came from a baby's grave in a cave which we named 'Owl Head Cave'," he said. "When the Basket Maker mother made this cradle, she did not intend that her baby's head should become flattened by a stiff cradle board. So, she shaped this ring of fiber to form a hollow for the head to rest in, the same sort of thing that a woman of the tropics uses to protect her head when she balances a jar on it.

"With the ring and the cradle was also a ball of the softest fiber with a string attached to it. This adjustable device belonged inside the fiber ring, and was the most ingenious part of the cradle. As the baby's head grew up to fill the hollow, the center ring could be altered for its comfort."

THIS BASKET MAKER BABY

Enjoyed comforts produced by the ingenuity of his ancestors. A unique fiber ring kept its head from getting flat in the cradle; the cradle itself was in reality an expertly woven basket; and the mother wore galoshes when she carried her infant during cold, wet weather.

The ancient cradle device shows how carefully the Basket Maker women insured their babies against the deformity of a flattened head, the archaeologist pointed out. Babies had a harder time of it in the Pueblo age, after the ancient Basket Makers had their day and disappeared. Pueblo fashion admired deformed heads, and Pueblo cradle boards were left severely hard on purpose, to flatten the skull at the back while it was still in a pliant state.

The Basket Maker baby that lay against the soft cradle some 2,000 years ago, was itself discovered by the expedition. To their surprise, its plump cheeks and baby features and tiny hands had been remarkably preserved in shape in the dry, hot sand. Mr. Bernheimer and his associate archaeologist, Earl Morris, lifted the fragile little brown baby out of the dust and photographed it, returning it to its resting place. It lay comfortably upon a blanket of fur string, a soft material which the Basket Makers produced by twisting strips of rabbit fur around a core of Yucca cords, and then weaving these furry threads into any size blanket desired.

That any Indians in America—a land abounding in furs—should have gone to so much trouble to weave fur blankets for themselves seems surprising at first thought. But rabbits and small fur bearers were more common in Basket Maker country than blanket-sized animals. So, when some inventive mind realized that rabbit fur could be made use of with a little extra effort, the Basket Maker world saw the practical value of the idea and used it extensively.

Doctor's Bag Unearthed

The baby Basket Maker that was found wrapped in its fur blanket probably did not die for want of a doctor, even in that remote canyon country. Medicine men were prominent figures among the Basket Makers as among later Indian communities, and evidence of one neighborhood doctor at least was unearthed in the course of digging in a nearby canyon cave. The object found here was the little black case of a medicine man. It contained no drugs or surgical equipment, but a bunch of feathers of several kinds. These, Mr. Bernheimer explains, were probably used with elaborate rites to invoke the aid of their gods in the treatment of the sick.

Out of a cave which the expedition decided to call Obelisk Cave came a new sidelight on American fashion history: The Basket Makers wore winter shoes, different from the summer style. Excavators have frequently brought out of the earth the square-toed sandals made by the Basket Makers for themselves and even for their babies, and the round-toed sandals that the Pueblos introduced as their fashion choice. One cave in Canyon del Muerto seemed like a prehistoric second-hand shoe store, so large was its assortment of used foot gear.

The winter style sandal now discovered is the prehistoric equivalent of the galosh. The inhabitants of the Southwest of long ago went about in cold weather in footgear far too big for them, it now appears, and they looked as conspicuous no doubt, as the modern flapper in her flapping storm shoes. When the first of the big sandals was lifted out of the earth, the excavators wondered and thought of giants. But it soon ap-

peared that the inside of the yucca-fiber sandal was stuffed thickly with cedar fiber, and at the expense of looks the Basket Makers had made their shoes both warm and wind-proof.

The sandals made in the ancient Southwest had a loop for the big toe and generally an eyelet at the heel to hold a shoe string firm for tying it about the ankle.

Another bit of ancient dressmaking which impressed the discoverers shows that American Indians long ago mastered the idea of a casing to hold a draw string. These casings are a feature of several well preserved gee-strings found this summer. The garments, made to be worn at the waist, were beautifully woven of thread, probably from the stalk of the native thistle, and still show clear and fine the patterns in yellow, red, black, and white. Rather than fasten a cord to each side of the garment, the Basket Makers devised a tube and ran the waist string through that. It is a remarkable bit of expert workmanship, Mr. Bernheimer pointed out.

Sewing, spinning, knitting, and weaving were all familiar household arts in the Southwest long before the people began to build houses worthy of the name. For needles, the Basket Makers used pointed bones or the spike ends of the yucca leaves, tying a thread into the desiccated part. For thread there was the fiber of yucca and thistle and probably cotton, and, what seems strange to us today, they drew heavily on the supply of human hair for thread and even for heavy cord.

Mummies of the Basket Makers have proved that the men preferred long hair—for themselves. But the women bobbed their black tresses with stone blades and the strands were twisted into as many threads as desired to make string and cord, even fifty strands sometimes going into a single heavy twist. The quantities of human hair found in Basket Maker belongings show how heavily the people depended on the women's crowning glory.

Storage Place For Hair

"In one cist in Last Chance cave, we found twelve large hanks of human hair together with large hanks of yucca fiber," Mr. Bernheimer reported. "Because of the quantity, we concluded that we had come upon the storage place of a spinning or weaving clan. One of the hanks of hair was braided and still retains its natural gloss."

Ways of carrying loads had to be devised by the Indians, since they had no beasts of burden. One way in which the problem was met was by the use of head bands. Two such very old carrier bands woven of yucca leaves were unearthed in the Arizona caves, and Mr. Bernheimer pointed out the neat, strong loops attached to the end of each band. With the band placed across the forehead and some hair rope run through the loops an Indian could carry a load securely on his—or most likely her—back.

"Some of the ingenious things from the caves do not photograph successfully," Mr. Bernheimer said, in describing a miniature carrier basket which some Indian made out of unbaked clay, probably to be worn as a pendant. "The little basket, pointed at the bottom and broad at the top, had two loops and a cord of red yucca. To decorate it, the maker had thrust pin holes through it in an irregular pattern, with a cactus spine probe."

"The Basket Makers used baskets for all sorts of containers, even for water jars," Mr. Bernheimer said, in leading up to his theory of how the Southwest acquired pottery. "When the baskets that had been so painstakingly and beautifully made became worn or torn in use, the Indians were reluctant to throw them away. You wouldn't think of mending a straw hat with mud, but eventually the Indians tried it for their baskets. It held and was satisfactory. Sooner or later, some mud-covered baskets came into contact with fire. Perhaps one was thrown into the camp fire in disgust because it had become useless. The basket burned up, but the clay hardened into a bowl.

"It is Mr. Morris' idea that they put the mud inside the basket, leaving the first clay bowls corrugated on the outside when the coiled basket shell was removed. I think that when the baskets became defective they covered them with mud, so that the inside of the bowl, rather than the outside, was corrugated. Both of us have found fragments that support our theories."

Another Introduction

The Basket Makers may have got their first introduction to the usefulness of mud in a different connection from household pots and pans, Mr. Bernheimer continued. When they dug little cists in caves for burial purposes and for storing supplies, they lined the little pits with flat stones to keep them from tumbling in. At first they calked up the underground storage cists or graves with fiber, to prevent rats and vermin from getting in. Later, they began to use mud stoppers, and some archaeologists believe that they went from this step to the use of mud in mending their baskets and eventually to pottery making in which they became such experts during later periods.

The finding of a basket design drawn on a cave wall suggests that Basket Maker weavers knew the value of designing a pattern "on paper" to see how it would look, before trying it with basketry. In a ceremonial chamber in one of the canyons visited, the expedition also found two sandal designs of the most exquisite and intricate pattern scratched on the walls.

Discovery of timbers in the caves may make it possible to say definitely when the early inhabitants of the Southwest lived.

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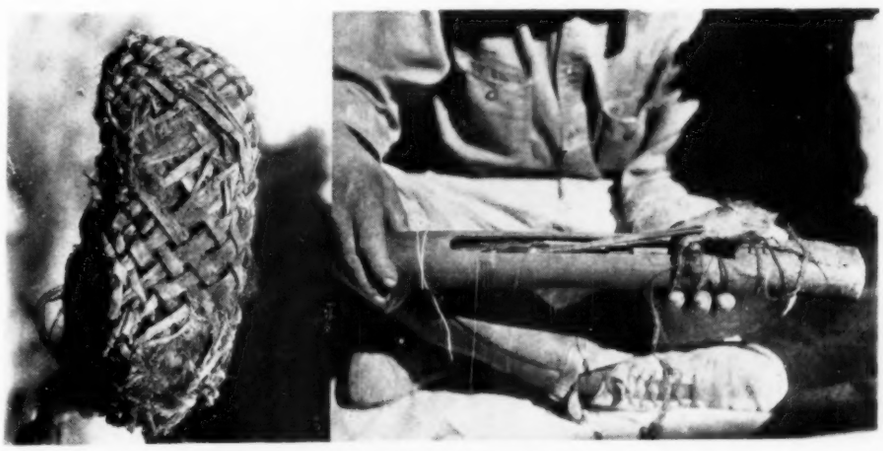

GALOSHES AND THE DOCTOR'S BLACK BAG

Comfort came first with the Basket Makers, so they packed these loose matted shoes with warm cedar fiber. The prehistoric medicine man's bag is full of feathers with which to invoke the aid of the gods in the treatment of the sick.

PHYSICS

Gravity Tests on Animals To Anticipate Space Travel

EXPERIMENTS on animals in large and small gravitational fields were suggested as preparation for travel through space to the moon and planets other than our own in a lecture given here before the Amateur Astronomers' Association by Dr John Q. Stewart, associate professor of astronomical physics at Princeton University.

"Passengers in a space cruiser, unless special provisions were made, would be subjected at different times to a variety of gravitational fields," he said. "At a height of, say, 13,000 miles, after the ship had attained a sufficient velocity to coast up the rest of the long hill toward the moon, nothing in the ship would weigh anything if the engines were turned off. On the moon people would weigh one-sixth of normal.

"Experiments with animals or even men could be made in a big rotating cage, since the centripetal acceleration would simulate gravity. Indeed it has been suggested that a big rotating cylinder inside a space ship might provide an artificial gravitational field, so that the crew could work under the normal condition.

"Experiments with guinea pigs in a region free from gravitation could be carried on by dropping a box full of them, with suitable recording instruments, down an excavated tube about as high as the Empire State Building. The box would be caught softly on springs at the bottom. The duration of the fall, however, would be less than ten seconds, and the large deceleration at the bottom might confuse the record."

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PALEONTOLOGY

Dinosaur Family History Yields New Clue

A HIGHLY important clue to life in the world 200,000,000 years ago, during the Triassic Period, has been yielded by fifteen tons of earth from the banks of the Little Colorado River, east of the Grand Canyon in Arizona. Barnum Brown of the American Museum of Natural History and L. I. Price of Oklahoma University sifted this material through fly screens to recover the remains of the probable reptile ancestor of the dinosaurs and the phytosaurs.

The siftings from the fossil earth were hauled ten miles to a spring before the fragments could be washed and looked over. This process required three weeks of patient work and rewarded the investigators with only enough fragments to cover the bottom of a cigar box a half inch deep. But these fragments were enough to enable the scientists to restore the rare little beast that lived before the dinosaur and is believed to be ancestor to it and to another ancient reptile, the alligator-like phytosaur. The small ancestral reptile is about three feet in length.

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PALEONTOLOGY

Census of Birds Caught In Tar Pit Completed

THE LaBREA asphalt pits near Los Angeles, which served as a vast animal trap for many centuries during the Ice Age, captured many birds in addition to their larger and more spectacular catches of saber-tooth tigers and other terrifying mammals now happily extinct. Dr. Hildegarde Howard of the Los Angeles Museum has recently completed a census of the birds from the famous pits. She finds that there are over 4,100 individual birds represented in these collections, 69 per cent of which are predatory species. Of these, the kinds that hunt by day are far in excess of the nocturnal types, the diurnal birds numbering 2,500, the owls but 400.

Of all species of birds, the golden eagle, which still exists, is most abundant, being represented by at least 880 individuals. Next in abundance is the extinct turkey, Parapavo, with 500 individuals. Other extinct species whose numbers total over 100 are: Teratornis, the great vulture-like bird, exceeding in size any bird of flight known today; a smaller vulture closely related to the modern black vulture; and a still smaller vulture type, related to the Old World group. The caracara, now limited in distribution to more southerly regions, is represented in the Rancho La Brea collections by 250 individuals.

Several other species, still known in California, occur in large numbers in the asphalt deposit: the California condor 190, the bald eagle 150, the red-tailed hawk 113, the burrowing owl 116, the great horned owl 104, and the quail 101.

Other types occur less abundantly. All of the ducks and geese together total less than 100, the shorebirds less than 60.

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IN SCIEN

RADIO

Says Radio Commission Blocks Good Rural Service

"ONLY the Federal Radio Commission now blocks the way to better radio on the farms and in the small towns of the nation." This is the charge made by O. H. Caldwell, a former member of the commission and now editor of *Electronics*, a magazine devoted to the vacuum tube and allied topics. He makes the statement in an editorial to appear in the forthcoming November issue of the journal.

"High power stations on every clear channel, is the only answer to the demand for satisfactory broadcast reception on the farms and in small towns remote from city centers," he states.

Continuing, he says, "The radio art, after costly research, is ready to supply broadcasting service of high technical quality to every home. The channels are cleared ready for it. Twenty-seven responsible broadcasters are willing to invest several hundred thousand dollars each, to bring city quality to additional rural millions in their sections."

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ORNITHOLOGY

Scientist Reports Attacks Of Owls on Human Prey

NUMEROUS cases of owls swooping down upon human prey are reported by Dr. Albert M. Reese of West Virginia University in *Science*.

Most of the victims were reported as being struck with the claws or beak of the bird and some suffered painful injuries. Dusk appears to be the favorite stalking time of the owls, though one encounter is recorded at the dawn hour and one on a moonlight night. In a number of cases the victims observed the birds had nests or young nearby.

Hunting grounds of the owls are not limited to a few lonely or isolated areas, evidence from points as widely separated as Texas or Oregon and Ontario, Canada, have convinced Dr. Reese. Policemen on their night beats in towns have even complained of the feathered attackers.

Science News Letter, November 15, 1930

FIELDS

CHEMISTRY

Swedish Chemists Seek Pulp Wood By-Products

SWEDISH chemists are at present engaged in research for the recovery of by-products from the manufacture of wood pulp.

According to a recent anouncement, two Swedish chemists attached to the Swedish College of Pharmacology have obtained a patent on a method for the extraction of phytosterin from sulphate soap (pine oil). It is claimed that this substance will prove a substitute for lanoline and rape oil as the base of salves and marine oil.

It is further stated that at least 18,000 tons of pine oil can now be recovered from the manufacture of sulphate pulp in Sweden, whereas the actual production is only about 5,000 tons. If sulphate soap corresponding to a quantity of 18,000 tons of pine oil is treated for production of phytosterin it would yield about 450 tons of this product, which, if used for marine oil, would yield no less than 90,000 tons of oil. Although the practical utility of the method has not yet been tested on a large scale the inventors think that it will prove a valuable means to reduce the cost of the pulp making and thus make the operations far more profitable.

Science News Letter, November 15, 1930

PSYCHOLOGY

Baby's Activity Multiplies During First 10 Days

THE ACTIVITY of the very young infant increases enormously during the first ten days of his life. And, contrary to the impression popularly entertained by the neighbors, the period of greatest activity is not between midnight and 2 A. M., but just before the 6 o'clock morning feeding.

These are among many other intimate details of the lives of the younger generation disclosed by a study made at the psychological laboratories of the Ohio State University at Columbus under the direction of Prof. Orvis C. Irwin.

As soon after birth as possible, the infant was placed under observation. A code had been arranged so the experimenter could record with a combination of numbers and figures the character of every move the child made from the pursing of his lips to the wiggling of his tiny toes.

But much to the surprise of the scientists, when the baby got hungry he moved so vigorously and quickly that the recorder's pencil was left far behind.

Five infants were studied. The average number of movements per minute on the first day was 11; on the tenth day it was 43. During the periods of all-over activity, the movements speeded up to 66 per minute for the first day and 418 per minute on the 10th day.

As the child grew older there were more movements of single parts of the body, and proportionately less of the all-over activity. This change in the character of the movements, Professor Irwin believes is due to the maturing of the infant's brain.

Science News Letter, November 15, 1930

GEOLOGY

Greased Mountains Once Part of Oregon Landscape

"LUBRICATED mountains" which have moved considerable distances and formed a landslide topography of unsurpassed grandeur and magnitude have been found in the John Day river area of interior Oregon by Dr. Edwin T. Hodge, University of Oregon geologist.

In the vicinity of Maupin butte, overlooking the John Day chasm, "great masses measured in square miles" have moved toward the river, producing landslide pockets and lakes, Dr. Hodge reports.

The university geologist explains that the topography is due to the fact that the Columbia river lavas, hundreds of feet thick in places, poured over the John Day river clays, a formation which is easily unconsolidated and softened by ground water. The clays form a lubricant on steep slopes over which the heavy, greatly jointed Columbia basalt slides.

Although the "greased" basalt found in the John Day basin of central Oregon moved from its original position before the coming of white man, Dr. Hodge sees no reason why similar slides should not occur in the present age, providing the underlying clays receive sufficient ground water.

Science News Letter, November 15, 1930

CHEMISTRY

European Chemists To Lecture at Cornell

EIGHT famous European chemists have accepted non-resident lectureships at Cornell University for the next four years, it has just been announced. The lectureships were established by George F. Baker, of New York, and the holders speak on topics in their own field of investigation.

Prof. Georg von Hevesy, of the University of Freiburg, Germany, one of the co-discoverers of the element hafnium, is here now. Next spring he will be succeeded by Dr. N. V. Sidgwick, of Lincoln College, Oxford. The holder of the lectureship next fall will be Prof. W. L. Bragg, of the University of Manchester, England, who was awarded the Nobel Prize in 1915 jointly with his father, Sir William Bragg, for their work on analyzing crystal structure by X-rays. Next will be Prof. Alfred Stock, of the Technical High School, Karlsruhe, Germany, then Prof. Cecil H. Desch, Sheffield, England; Prof. Otto Hahn, Kaiser-Wilhelm Institute for Chemistry, Berlin; Prof. V. M. Goldschmidt, Göttingen; and Prof. Robert Robinson, of London University.

Science News Letter, November 15, 1930

AERONAUTICS

Gas Cells Increase Safety Of New Sky Warrior

See Front Cover

THE first gas cell of the new U. S. Navy airship, Akron, which will be the largest and safest lighter-than-air craft in the world, was being tested when the photographer took the picture on the front cover at the Akron airship dock, Akron, Ohio, where the ship is being built by the Goodyear-Zeppelin Corp.

The cells are an important factor in the safety of the new craft. Twelve compartments will contain the individual cells which range in size from 80,000 to nearly a million cubic feet. They make up the airship's total gas capacity of 6,500,000 cubic feet. The huge size of the ship is emphasized in the picture by comparing it with the 80,000 cubic foot blimp alongside.

The Akron, formerly designated as the ZRS-4, will be primarily a fighting craft. She will have a built-in hangar for five airplanes and will carry 16 50-caliber rapid-fire machine guns. Her cruising radius at 60 miles an hour will be more than 10,000 miles.

Science News Letter, November 15, 1930

ASTRONOMY

Kepler's First Discovery

"A Classic of Science"

Three hundred years ago today, Kepler, the mystic, the medieval astrologer and the modern astronomer, died.

It is perhaps unfair to represent Kepler by his famous but fanciful "law of the five regular solids." Yet he himself believed this one of his greatest astronomical discoveries, and it led to all his future greatness. It brought him the friendship of Galileo and other great astronomers, including Tycho Brahe, whose assistant and successor he became. The law of the five regular solids shows Kepler's belief in simple mathematical relations in the orbits of the planets. A lifetime of testing this belief led to the discovery of the laws which bear his name. He would not have found that the orbits of the planets are ellipses, that a line drawn from a planet to the sun sweeps over equal areas in equal times, and that the squares of the periods of the planets are proportional to the cubes of their mean distances from the sun, had he not puzzled over such numerical relations as those he found here.

Prodromus Dissertationum Cosmographicarum, Continens Mysterium Cosmographicum a M. Joanne Keplero. Tubingae. MDXCVI (1596). Published in Joannis Kepleri Astronomi Opera Omnia. Edidit Ch. Frisch. Vol. I. Frankfurt. MDCCCLVIII (1858). Translated for the SCIENCE NEWS LETTER *by Helen M. Davis.*

TO THAT most brilliant man, D. M. Michael Maestlin, most celebrated professor of mathematics in the Academy of Tübingen, teacher and advocate of that constant observation cultivated by himself:

We have all the measurements of the inscribed orbits, when the circumscribed have a total length of 10,000,000.

inscribed cube would be	5773503
pyramid	3333333
dodecahedron	7889445
icosahedron	7946545
quadrated octahedron	7071066
true octahedron	5773503

Now, if we compare with these the measurements published by Copernicus, we will perceive that the differences are slight.

For if at minimum eccentricity we have

Saturn	8°39'23"
Jupiter	4°58'49"
Mars	1°22'26"
Earth, without the Moon	0°57'30"
Venus	0°40'40"

then calling the maximum eccentricity 10,000,000, we have

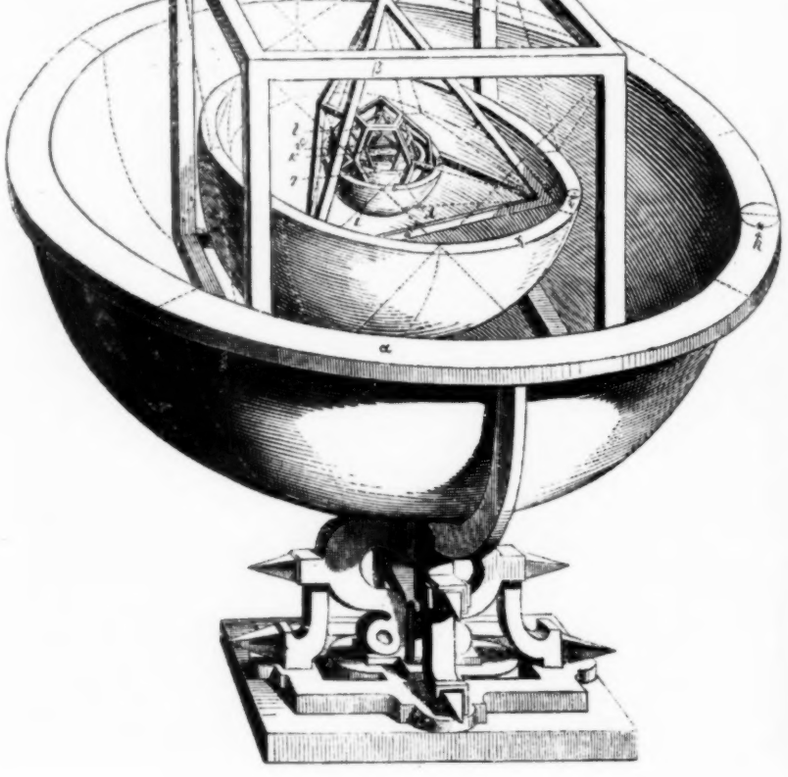
Jupiter	6189712
Mars	3344302
Earth	7581886
Venus	7942029
Mercury	7278770
in the center	5831967

From this we reach other considerations. First that it is proved by the reasoning above that the dodecahedron comes before the icosahedron, and that this is preferably placed between Mars and the Earth: thus this reasoning proves that the inscribed dodecahedron corresponds more nearly to the Earth, the icosahedron to Venus.

Then, the peculiarities in the motion and eccentricity of Mercury show a different variation compared to those of the others, so also, the octahedron alone has the property that the great circle tangent on four sides is far larger than the largest inscribed in the orbit. Which adds much probability to the theory.

For if the eccentricities were proportional to the distances (which I doubt, the findings not being perfect in all cases) Mercury ought to have for its greatest distance a little more than half: perhaps about 5900000.

Now while Venus comes out exceed-



PLANETS AND POLYGONS

The correspondence between astronomy and numbers, according to Kepler's fancy.

ingly small, Mercury ought to be less. Yet their common ratio points a finger toward the common ratio of the maximum distances from the sun, which forces us to consider the inscribed orbit of the body which is 5773503.

But since Mercury alone exceeds at its maximum the usual number inscribed in the other circle (for it is not admissible for this planet to substitute 57 for 72) therefore the octahedron alone is certainly right, since its 4 equal straight sides give room for a larger circle than any other, its radius is 7071066, again, little less than the maximum whose value is 72, just as before 57 was a little less than 59, the usual value.

I look forward to a great truth, whose outlines and substance seem to me ready. Yet because the calculation of these bodies does not agree perfectly with the opinion of Copernicus and with his numbers, those more ignorant of astronomical matters may believe all these calculations to be deceiving me.

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ASTRONOMY

Kepler's Memory Honored At Tercentenary of Death

GERMAN astronomers and mathematicians are now being joined by their colleagues from other countries to honor the memory of one of the greatest of their predecessors—Johann Kepler. He was born in the little town of Wiel, near Stuttgart in Württemberg, on Dec. 27, 1571, and died at Ratisbon, in Bavaria, on Nov. 15, 1630, just three centuries ago. At the place of his death commemoration celebrations are being held, especially at a cenotaph which was erected there to his memory in 1803.

Kepler, whose name was recently included by George Bernard Shaw in a list of eight "universe makers" from Pythagoras to Einstein, was imperial mathematician to the Emperor Rudolph at Prague, for many years. He went there in 1600 to assist Tycho Brahe, the great Danish astronomer who had taken refuge under Rudolph's protection after a new king in Denmark had failed to continue his predecessor's interest in science. Tycho died a year after Kepler came, but in that year Tycho turned over to him the observations which enabled him to discover the laws of the motion of planets.

Personally, Kepler described himself as lank, lean and spare, and said that "for observations his eye was dull and for mechanical operations his hand was awkward." Therefore, it was especially fortunate that he fell heir to the observations of Tycho Brahe, who was one of the greatest astronomical observers of all time. Tycho's skill furnished the observations without which Kepler would have been helpless, while Kepler's mathematical perception enabled him to do things with them that would never have been possible for Tycho.

One of his chief characteristics was his great frankness. In his books he not only tells of his successful work, but also describes the errors that he committed before he saw the light.

Science News Letter, November 15, 1930

MEDICINE

Leprosy is Being Attacked By Chemical Warfare

Scientists Now Studying Tuberculosis Bacillus Given New Research Because of Similarity of Germs

SCIENTISTS have resorted to chemical warfare in what is hoped will be a decisive attack on one of mankind's much-dreaded foes, leprosy. As a beginning in their efforts to find an agent useful in fighting the disease, the chemists will make an intensive study of the germs that have been grown from cases of leprosy, in contrast to the recently studied germs of tuberculosis, for the leprosy germ belongs to the same family.

The same group that is studying the secrets of the tuberculosis bacillus has been asked by the Leonard Wood Memorial to undertake the study of leprosy. The research will be directed by the Medical Research Committee of the National Tuberculosis Association, of which Dr. William Charles White, of the U. S. National Institute of Health, is the chairman.

As in the recent attack on tuberculosis, hundreds of thousands of leprosy bacilli will be grown in the laboratories of the H. K. Mulford Co. These will be taken to the Sterling Chemical Laboratory of Yale University where they will be analysed under the direction of Prof. Treat B. Johnson. At the same time the clinical studies with leprosy patients will be carried on at the government institutions for the care of lepers and in those of the Leonard Wood Memorial.

The tuberculosis investigators and fighters have been called in to study leprosy because of certain similarities between the diseases. For instance, the germs causing the two diseases are members of the same family. They even grow in the same cells of the human body, the monocytes. The germs of tuberculosis, however, invade mainly certain parts of the body, such as the lungs, while the leprosy bacilli occur chiefly in the skin.

Some 15 or 20 strains of lepra bacilli have been cultivated from human cases, but until recently it has never been possible to produce leprosy in any animal by transferring any of these germs to the animal's body. The accomplishment of this feat has just been announced by Prof. K. Shiga of the Imperial Medical Faculty at Seoul, Korea. He claims to be able to produce leprosy in rats by injecting the lepra bacilli into rats whose powers of resistance were weakened by having lived on a diet lacking in vitamins.

Why vitamins protect against leprosy, if it is proved that they do, may be understood when scientists find out the chemical nature of the leprosy germs and also the chemical nature of the vitamins. At that time, also, a specific remedy for the disease may be found or developed. The only remedy used at present, chaulmoogra oil, has not fulfilled all the expectations held for it.

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MINING

Few Mines Protected From Explosions by Rock Dusting

For a Cost of Less Than One Cent Per Ton of Coal Mined Inert Dust Would Prevent Many Fatal Explosions

GREAT coal mine explosions like the one which claimed about 80 lives at Millfield, Ohio, are preventable disasters, because they probably need never occur if every mine were to make use of the precautionary measures, especially rock dusting, already worked out by mining engineers, it is believed by George S. Rice, chairman of the Mine Safety Board, of the U. S. Bureau of Mines.

Coal when in the form of dust suspended in air is explosive; and in coal mines, as in blasting powder plants, every precaution is necessary in order to prevent explosions and fire. At this time of the year when the mines are working to capacity, and coal dust becomes dry from the entering cool dry air, operators should be particularly vigilant and cautious.

Government recommendations and state regulations have placed in the hands of mine operators information regarding the most effective methods of guarding against disasters. All open lights or other sources of ignition, whether from lamps, open sparking machinery, or flaming explosives, should be avoided.

Another approach to the problem, besides the elimination of sources of ignition, is the thorough ventilation of the mine and the treating of the explosive coal dust by what is known to mining engineers as "rock dusting."

Rock dusting is a recently adopted method of making the coal dust non-explosive. Finely pulverised inert material is spread in the mine and mixed with the coal dust so as to dilute it. If more than 65 per cent. of the mine dust is incombustible, the mixture can not explode in a dust cloud. Every portion of the mine must be thoroughly and constantly rock dusted for complete safety.

The safety division of the U. S. Bureau of Mines has found that notwithstanding the fact that mining engineers generally recognize the fact that widespread explosions can be almost absolutely prevented in coal mines by this method, rock dusting is not yet used in the majority of our coal mines. Despite the fact that thorough rock dusting would cost less than one cent per ton of coal, only a small percentage of the mines in this country are thoroughly rock dusted. In Ohio, of the approximately 600 mines operating, according to latest reports, only about five are rock dusted. A larger number are partially rock dusted and this lessens the hazard to a degree. The Millfield mine was not even partially rock dusted.

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MEDICINE

Glandular Extract Fails To Cure Cancer in Mice

EXTRACT of the adrenal cortex glands, which has been the underlying factor in a number of recently suggested treatments for cancer in man, has no curative effect on cancers in mice, Drs. Shigemitsu Itami and Ellice McDonald of the University of Pennsylvania have just reported to *Science*. Since cancer in mice is comparable to cancer in man, Drs. McDonald and Itami conclude that the use of this glandular extract is not suitable for treating cancer in man.

Their work was prompted by the announcement last winter of Drs. W. B. Coffey and J. D. Humber of San Francisco that they had developed a successful method of treating cancer with an extract of the cortex of the adrenal glands. The use of glandular extracts for treating this disease had previously been studied and described by other investigators, but the greatest claims have been made for the Coffey-Humber method. The men are reported to have treated 2,000 patients during the last year.

The University of Pennsylvania investigators used a glandular cortex extract prepared by Drs. W. W. Swingle and J. J. Pfiffner of Princeton University. This extract has proved capable of substituting for the hormone secreted by the adrenal cortex itself in animals that have had their adrenal glands completely removed.

"Not a single tumor in two dozen mice was arrested clinically, the results having thus been entirely negative," Drs. McDonald and Itami reported. "Death occurred at the customary times in all the animals, and the injections were without effect. As spontaneous growths of the mouse are analogous with those of man, it is very probable that the treatment here described would be useless in the human patient."

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Cathode rays can be used to detect an artificial sapphire that is posing as a real gem.

A MADE-TO-ORDER COAL DUST EXPLOSION

Set off in an experimental shaft of U. S. Bureau of Mines at a meeting of the National Safety Council last month. The dust blew out of the ground and exploded in mid-air. Red flames are to the front and behind them, billows of smoke.

GENERAL SCIENCE

Notebook of Science

No Honor Among Some Parasites

THERE is no honor among thieves in at least some parts of the world of parasitic fungi that prey on plants. Scientists at the Rothamstead Experimental Station, England, have discovered parasites preying on closely related parasites in cultures kept in their laboratories. Even sister-strains derived from the same original parent will indulge in this vegetable cannibalism.

Mice Have St. Vitus Dance

A PECULIAR condition, like St. Vitus' dance in human beings, has been found in mice, Elizabeth M. Lord of the Carnegie Institution of Washington and Prof. William H. Gates of Louisiana State University have reported to the *American Naturalist*. The condition appeared suddenly in individuals in two families in a stock of normal albino mice. The scientists have reported it as a new mutation which they have called "shaker."

The mutation shows itself principally in the form of nervous head movements. The condition is hereditary. Apparently a new species of mice has developed from the common house mouse.

Bird's Song Timed

TWILIGHT in some instances too dim to favor human activities in some unexplained way times the first morning song of birds, a study of Washington birds has convinced H. A. Allard, of the Bureau of Plant Industry, U. S. Department of Agriculture.

While the different birds start their songs at different hours of the early dawn known to scientists as "civil" or "astronomical twilight," each species starts singing at a relatively constant time before sunrise.

Amateur Lightning Photographs

AID of amateur photographers throughout the world is invited by M. Em. Touchet, vice-president of the French Astronomical Society, in securing the photographs of lightning. Announcement has been made that such pictures could be sent to the society at the Hôtel des Sociétés Savantes, 28 Rue Serpente, Paris. Especially desired are photographs of ball lightning and stereoscopic photographs that will show a flash in perspective.

All that is necessary is to point the camera to the region where most of the flashes are occurring, at night, and open the shutter.

Inland Crabs

REPORTS of sea crabs and salt water fish caught far inland in rivers of the Atlantic seaboard are entirely possible and credible, U. S. Bureau of Fisheries authorities say in passing judgment on these 1930 model fish stories now current.

Would Save Surgery

A PLEA to save the practice of surgery from becoming too much of a product of the machine age was voiced by Dr. C. Jeff Miller of New Orleans in his presidential address before the first general session of the annual clinical congress of the American College of Surgeons held in Philadelphia.

Wrench as Meteorite

WHEN a farmer near Perkasie, about thirty miles from Philadelphia, recently heard a roar, a whistling sound and then saw a cloud of dust arise as something hit the ground, there was some justification for thinking that he had seen the fall of a meteorite. When Samuel G. Gordon, associate curator of minerals of the Academy of Natural Sciences, went to investigate he found that something actually had fallen from the sky. But it wasn't a meteorite, it was a wrench accidentally dropped from an airplane at considerable altitude!

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SEISMOLOGY

New Orleans Earthquake Located by Old Method

AFTER nearly three weeks of work, collecting reports from people who felt it, Capt. N. H. Heck, of the U. S. Coast and Geodetic Survey, has located the position of the earthquake near New Orleans on Sunday, October 19. Capt. Heck, who is chief of the survey's division of terrestrial magnetism and seismology, said that the determination of the center of this quake was delayed because of the lack of reports at the time from seismograph stations. The center was about 65 miles to the west of New Orleans, not in the Gulf, as was supposed at first.

This quake was located by the old method of isoseismals, that is, lines of equal force of the earthquake. By collecting information from a large number of people who felt the shaking, it is possible to form a good idea of its intensity at various locations. These can be plotted on a map, like the isobars, or lines of equal air pressure, on a weather map. The intensity of the quake weakens as one gets away from the center, so the isoseismals are roughly circular. Their center then marks the center of the quake.

To collect and plot these data takes considerable time, but if the quake is recorded by a few seismograph instruments at scattered points, the location of the center can be made with much greater speed. The Louisiana quake, however, was not a very violent one, and so was not detected on many instruments.

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The Mayan Indians of tropical America probably smoked their tobacco in the form of cigars more often than in pipes, says J. Eric Thompson, ethnologist of the Field Museum.

HORTICULTURE

Guayule Produces Rubber Only When Its Life is Hard

THE GUAYULE plant, source of America's new home-grown rubber, will not stand too much coddling. Certain luxuries of cultivation, principally ample irrigation, cause it to lie down on the job.

Dr. David Spence, technical director in charge of guayule culture near Salinas, Cal., described to the American Chemical Society here his recent experiences in making desert bushes grow rubber. The first really substantial California crop, due this winter, promises to give the rubber industry something to think about.

Guayule, an unimposing, scrubby bush of the sunflower family, seems to have been cast out by Nature to fight for a living with cacti, creosote bushes and the like in the arid desert wilds of Mexico. Peons earn a scant living by uprooting the plant, transporting it by donkey to the coast, and selling it to rubber producers.

American rubber interests have long been fearful of an emergency involving embargo on tropical rubber. Under the leadership of Dr. Spence, they have chosen California as the most likely state in which to develop the domestic product.

If the guayule plant is forced to endure a drouth of several months, it will produce a multitude of fine droplets of rubber all through its larger stems and roots, particularly near the cambium or new-wood layers. As high as 18 per cent. of the total weight of the bush is actual rubber in the new high-bred strains of the plant being propagated at Salinas. If, however, the plant be given a continuous supply of moisture in the manner common to ordinary agricultural crops, it just forgets to grow rubber. Life is apparently too soft. The plant simply vegetates and makes an immense amount of worthless brush.

The central valleys of California afford a climate suited to this situation. No rains of any significance occur between May and October, and comparatively little in April and November.

Selection Is Difficult

Scores of inferior varieties of this plant have been rejected. An almost uncanny scientific intuition has been developed in picking good rubber-producing strains, based largely on appearances of nursery stock and seed. It is not easy to select winning stocks as with potatoes and corn, since the desirable plant has to be destroyed before its merits are mathematically proven, and before it produces seed.

California guayule rubber was subjected to recent tests in auto tire formulas in a local plant. Results indicate that it is nearly equal to Hevea or tropical rubber in tensile strength, elasticity, etc. Chemically it seems to be identical with the ordinary caoutchouc of commerce. The Salinas experiments promise acreage yields close to those of the tropics. Closer plantings may run the yields even higher than those of Hevea. Just at present the low market offers no promise of profit in guayule rubber, and commercial prospects are very much those of the future.

Science News Letter, November 15, 1930

ENTOMOLOGY

Nature Ramblings

By FRANK THONE

Dormant Butterflies

WE COMMONLY think of insects as utterly helpless in the face of winter, unless like the much over-rated ant, they take refuge under ground or in some other tight shelter. The improvident grasshopper is doomed to destruction, and we are apt to think of the frivolous butterfly as even less able to face the rigors of cold weather.

Yet there are a few of these "flying flowers" that regularly live through the cold season in a state of suspended animation, like that of a hibernating ground squirrel or frog, only probably even deeper than theirs. The common mourning-cloak butterfly, the beautiful dark-winged insect that haunts the shadows of the woodlands, is among these. She takes refuge under a projecting limb of a tree when cold weather comes, and calmly goes to sleep there. When thaws come, she thaws out also, and flits about a little, in search of food. Oozing sap or soggy frozen-and-thawed apples on the ground will supply a hasty pick-up meal before she goes back to roost again.

What happens to such hibernating insects is still pretty much of a riddle of animal physiology. There is no question that they are frozen; frozen as solid as a bird that dies of the cold. Yet they do not die. Their circulation must be stopped, or nearly stopped, and they certainly do not breathe. The secret seems to lie in the tissues of the body themselves; somehow they are able for long periods to dispense with the food brought by the blood plasm, and with the oxygen from breathed air. But how?

Science News Letter, November 15, 1930

The world's first metal-base highway was recently completed at Springfield, Ill.

ENGINEERING

Waste Natural Gas Used to Increase Oil Well Yield

New Method Employing Smoke to Prevent Dread Tanker Explosions Also Described Before Petroleum Institute

THE BILLIONS of cubic feet of natural gas wasted to the atmosphere in the production of oil can be pumped back into the wells from which it came in order to force to the surface oil that would otherwise be lost.

Not only will gas returned to the wells increase production, but if little gas is allowed to escape from a producing well more oil will be obtained, it was brought out in a paper on improvements in production practice presented by W. W. Scott of the Humble Oil and Refining Co. of Houston, Texas, before the meeting of the American Petroleum Institute in Chicago this week.

"In any oil pool that depends upon gas movement for production, and one in which it is possible for a single operator or a group of operators to develop the pool as a unit," Mr. Scott said, "the cost of conserving gas and returning it to the reservoir will be amply repaid by reduction of lifting cost and increased production from the pool."

As an example of the important role played by natural gas in the production of oil, Mr. Scott mentioned the Sugarland field located in the Texas Gulf Coast area about 25 miles southwest of Houston, which, he said, holds a unique position among present day fields.

85 Per Cent of Gas Returned

"In this field," he continued, "it has been possible to produce oil in such a way as to allow the average pressure in the reservoir to fall off as slowly as possible with a given amount of production. . . . All of the gas produced with the oil is collected and about 85 per cent or more has been compressed and returned to the reservoir. The injection pressure is approximately 1,400 pounds."

Greater ultimate production and lower pumping cost were declared to be the advantages of this procedure.

An exact scientific test of the benefits to be derived from returning gas to a pool which has reached its economic limit is being made in a field of the Humble Co. near Olney, Young county, Texas, Mr. Scott said. Gas injection was started in January, 1930, and by October 1 almost 100,000,000 cubic feet had been forced into the pay sand, and the oil reservoir pressure lacked only a few pounds of reaching 400. Production at the most efficient rate will begin about December 1.

Preventing Disasters

Smoke brought from the fire boxes of engine room boilers and put in the same compartments with highly combustible petroleum products has been found effective in preventing explosions of oil tankers, the most serious source of disaster in the petroleum industry, engineers also reported to the Petroleum Institute. The method has also been applied with success to lessen the danger of explosion both of large petroleum stores on land and of oil in the actual production and refining processes.

The secret of lessening the combustion hazard with the products of a previous combustion depends upon the fact that smoke, or flue gas, is made up of a large amount of inert gases that will not react with oil or its vapors to cause an explosion. This gas is pumped into oil compartments to replace air which contains a dangerous amount of oxygen. Before it is introduced into the actual presence of oil it is thoroughly cooled and cleaned of soot in water scrubbers.

"When the average tanker is loading," explained H. H. Hall of the Standard Oil Co. of San Francisco, Calif., while describing the hazards of oil vapor, "vapor is expelled onto the deck through the ullage holes, and workmen must walk to and fro regulating the flow of oil into tanks, adjusting the ship's lines and other equipment, getting back and forth from quarters, etc. Then, when the ship discharges, air is normally drawn into the tanks to replace the oil as it flows out; and there is frequently just enough oil vapor left in a tank to make, with the air drawn in, a violently explosive mixture. . . ."

The application of flue gas to fire protection is not new, but in the past it has been used almost exclusively to extinguish, not prevent, fire. The Shell Oil Company has used flue gas to protect its reservoirs for a number of years, Mr. Hall said.

Inactive nitrogen is the chief component of flue gas. It has a carbon dioxide content of approximately 9 to 13 per cent and oxygen only two to eight per cent. Hydrocarbon vapors normally present in oil refineries are explosive in ordinary air when their concentration is between one and 15 per cent. Higher concentrations tend to burn, but not to explode, it was brought out.

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First Glances at New Books

Chemistry

CREATIVE CHEMISTRY—Edwin E. Slosson—*Century*, 341 p., $3.50. Creative Chemistry has done more than any other one book to interpret and popularize chemistry. This revised edition, completed by Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, from material and notes left by Dr. Slosson at the time of his death last year, will therefore be welcomed not only by the thousands who read the first edition but by thousands of a new generation. Prof. Julius Stieglitz of the University of Chicago, in his introduction to this edition, says: "The man to whom more than to any other single individual this country owes its awakening to the almost infinite beneficient possibilities of the science of chemistry is the late Edwin E. Slosson. His *Creative Chemistry* has educated our whole people."

Science News Letter, November 15, 1930

Philosophy

OUR KNOWLEDGE OF OTHER MINDS—W. Wylie Spencer—*Yale University Press*, 145 p., $2. A carefully developed essay on one of the basic problems of philosophy. The idea on which the author bases his argument is that "the more concrete and specific is our understanding of the nature and vital activities of mind the more possible it becomes to render the existence of other minds capable of proof, and likewise the more intimate our contacts with other persons the better we are able to know them as minds."

Science News Letter, November 15, 1930

Astronomical Fantasy

THE MAGIC UNIVERSE—Mary Graham Bonner—*Macaulay*, 250 p., $2.50. "Not one grain of the dust of scholarship can be detected in it," say the publishers of this book in a "blurb" accompanying it. That is quite correct. Scholarship has been thrown to the winds, and the result is a sort of fairy tale which may be rather amusing to young children, but it is doubtful whether they will know much more about astronomy after reading it than when they began. The cartoons which "illustrate" it (one shows Saturn smoking a pipe) are also mildly entertaining, but it would have been much better to have substituted, for some of them at least, a few pictures showing what the celestial objects referred to actually look like. Perhaps no astronomer could have been induced to wade through it, but if one had, he might have caught some of the scientific errors that occur, such as the reference to the moon always keeping the same face to the sun, to the photosphere (the outer layer of the sun) as an instrument, or to the Orion nebula as being outside the galaxy.

Science News Letter, November 15, 1930

Natural History

ANIMAL CHILDREN—Paul Eipper—*Viking*, 70 p., $2. A book written by a lover of animals—one who has watched them quietly, "hardly daring to breathe" in order to obtain the charming photographs which illustrate the volume and the intimate details of animal child life which make up the text. Anyone who has had the pleasure of reading the author's "Animals Looking at You" will welcome this new creation from his pen and from the camera of his associate, Hedda Walther.

Science News Letter, November 15, 1930

Child Study

HUMAN CHILDREN—Paul Eipper—*Viking*, 70 p., $2. The charming and most unusual photographs from the camera of Hedda Walther are in complete harmony with the poetic character of the text. The author is a sympathetic father as well as a wise student of youthful human nature. This delightful book is a companion volume to the author's "Animal Children."

Science News Letter, November 15, 1930

Genetics

THE GENETICS OF DOMESTIC RABBITS—W. E. Castle—*Harvard University Press*, 31 p., $1.25. A book which will be of interest to the geneticist and of practical use to the breeder of rabbits and the fur farmer. Illustrated with 39 plates.

Science News Letter, November 15, 1930

Pathology

THE PATHOLOGY OF DIABETES MELLITUS—Shields Warren—*Lea and Febiger*, 212 p., $3.75. A valuable and important book for the physician and medical student. Not for lay readers.

Science News Letter, November 15, 1930

Archaeology-History

MESOPOTAMIAN ORIGINS—Ephraim A. Speiser—*University of Pennsylvania Press*, 198 p., $3. In this book Professor Speiser advances a new theory regarding the founders of the great civilizations of the Near East, and he builds up his case with due scholarly hesitation but very convincingly. His view is that aside from the Semitic and Sumerian elements, most of the peoples of Mesopotamia, hitherto unclassified, can be organized into a single, interrelated group, and for these he accepts the suggested name Japhethites. The earliest civilizations between the Tigris and the Euphrates are traced to their efforts. Professor Speiser brings three lines of evidence to a focus on his subject—evidence from archaeology, languages, and historical records. The style is sufficiently non-technical so that the layman who is really interested can read and learn, and at the same time the student of Old World civilizations will find the book documented to his taste.

Science News Letter, November 15, 1930

Physics

PHYSICS—Herbert Brownell—*Winston*, 644 p., $1.64. Here is a new and well-written physics text for high schools that should be popular with student and teacher alike. It is entirely up-to-date, devoting space to such modern physical developments as television, talking movies, electric refrigeration, the autogiro and others. These should make it interesting to the student and at the same time the well-planned exercises aid the teacher.

Science News Letter, November 15, 1930

Vocational Guidance

A SOURCE BOOK FOR VOCATIONAL GUIDANCE—Edna E. Watson—*Wilson*, 241 p., $2.25. Intended as a reference book for the counselor of youth. The first part of the volume contains inspirational material including the inevitable "It Can Be Done" and another "If" parody. For the rest, there are references to biographies, magazine articles, and other literature pertinent to various occupations, and some good advice in informal letter style.

Science News Letter, November 15, 1930